Bearcat IV

FM MONITOR RECEIVER

MADE IN U.S.A.

OPERATING INSTRUCTIONS

WARNING
TO PREVENT FIRE OR SHOCK HAZARD DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

PATENTED UNDER ONE OR MORE OF THE FOLLOWING U.S. PATENTS:
3,531,724
3,665,318
3,714,585
3,725,788

Electra COMPANY

DIVISION OF MASCO CORPORATION

CUMBERLAND, INDIANA 46229

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GENERAL DESCRIPTION

The Bearcat IV is a table and mobile model, four-band FM monitor receiver providing automatic scanning of 8 channels in all of the four Public Safety/Business Bands at 30-50mHz, 146-174mHz, 450-470mHz, and 470-512mHz. Its features include: Full-band coverage in all 4 bands; 8 plug-in crystals in any combination may be used; high speed automatic or manual scanning; channel switches to omit scanning of undesired channels; solid state Light Emitting Diode channel indicators; quieting squelch control; front-mounted 3"x5" speaker; external speaker jack; cables for 117V ac or 12V dc operation; and operation from a single telescoping or outside antenna.

The most advanced developments in solid state circuitry are incorporated in this receiver; dual-gate MOS Field Effect r-f and mixer transistors provide low noise and low cross-modulation. Single conversion into monolithic quartz crystal i-f filters reduces spurious responses and radiation and improves selectivity; linear integrated circuits provide i-f gain, detection, audio amplification and output; TTL I.C. multivibrators and gates provide scanning logic; desired channels are scanned with no time lost scanning unwanted channels.

An exclusive track-tuning system using voltage-variable capacitators provides high performance full-band coverage.

SPECIFICATIONS

Size: 9" W x 3 5/8" H x 6 1/8" D

Weight: 5 lbs.

Cabinet: Heavy duty vinyl-clad steel. Non-sliding feet.

Power Requirements: 117Vac, 15W; 13.8Vdc, 10W.

Antenna: Telescoping antenna (supplied). Connector provided for outside or mobile antenna

Input Impedance: 50-70 ohms.

Sensitivity: H and L bands: readable at .25 microvolt for $\pm$ 5kHz deviation, .6 microvolt for 20 dB signal-to-noise ratio: U/T band slightly less.

Channels: Up to 8 crystal-controlled channels may be scanned automatically or selected individually or in any combination.

Frequency Range:

Low band 30-50 mHz (Aligned 33-48mHz)

High band 150-174 mHz, total spread 24 mHz.

UHF band 450-470 mHz, total spread 20 mHz.

UHF "T" band 470-512 mHz, total spread 42 mHz.

Scan Rate: Approximately 25 channels per second.

Crystals: Miniature plug-in type HC-25/U for easy user installation.

Accessories Supplied: All-band telescoping antenna / Universal mobile mounting bracket / 117 Vac power cable / 13.8 Vdc power cable (Connects to "Accessory" or "Radio" fuse block. FOR USE WITH NEGATIVE GROUND SYSTEMS ONLY).

Front Panel Features: Squelch control / Volume on-off control / Combined Manual-Scan Channel Select Switch / 8 channel switches / 8 Light Emitting Diode channel indicators / Forward-facing 3" x 5" speaker.

Listed by Underwriters' Laboratories, Inc.

Certified under FCC Reg. Part 15.

INSTALLATION INSTRUCTIONS

This receiver is shipped complete with the necessary accessories for mobile or table use. As a fixed receiver in areas of fair-to-good signal strength, the telescoping whip antenna supplied. may be used on all bands.

If an outside antenna is necessary for fringe reception, you may use a 155mHz antenna on all bands, a 40mHz antenna for L and H bands or a 460mHz antenna on U band only. External antennas should be coupled to the receiver by 50 ohm coaxial cable, such as RG-58 A/U, using the supplied automotive type connector. Suitable antennas are available at most radio dealers.

The BC-4 has high noise immunity because of the noise squelch system. However, the noise generated by the auto electrical system and other parts of the car is sometimes a problem, particularly in areas of low signal strength. The subject of noise elimination is too lengthy to deal with adequately in this instruction book.

It is recommended for those who wish to become familiar with the subject to purchase "The Radio Amateur's Handbook" or "The Mobile Manual" published by the American Radio Relay League and sold by most electronic parts stores. It is further recommended that the vehicle be taken to a service center which specializes in VHF-UHF two way radio communications equipment for correction of a noise problem.

MOBILE INSTALLATION

This receiver may be installed in any car, truck, boat, etc., having a 12 VOLT NEGATIVE GROUND SYSTEM.

In some areas it is illegal for unauthorized persons to receive police communications on a mobile receiver. The user of this radio is responsible for obtaining any necessary authorization through local agencies and Electra Company cannot be responsible for any illegal installation or usage.

1. Place the mobile mounting bracket under the dash to hold the receiver in the desired position.
2. Mark and drill two holes using a 7/64 drill bit and secure the bracket with the two No. 6 self-tapping screws.
3. Insert the two plastic "T" washers, flanges turned inward, in the desired pair of mounting holes and secure the receiver in place with the two 1/4-20 bolts and two 1/4" ID x 9/16" OD flat washers.
4. Attach the DC power cable and connect it to the "accessory" or "radio" terminal on the fuse block.
5. External mobile antennas may be used as described above. The automotive antenna may be used fully extended for L or H bands. It should be reduced to approximately 18" for U bands.

OPERATION

1. With the power cable and antenna properly connected, turn the receiver ON by rotating the "VOLUME" control clockwise.
2. Place the 8 channel switches in the up (ON) position.
3. Set the "MANUAL-SCAN" switch on "MANUAL".
4. Adjust the "SQUELCH" control clockwise until the rushing noise is heard. Then adjust the "SQUELCH" control counterclockwise until the rushing noise disappears.
5. Press the "MANUAL-SCAN" switch downward and continue to step through all channels. If the noise should "break the squelch" on any channel, adjust the squelch control counterclockwise again slightly to quiet the receiver. THIS MUST BE DONE BETWEEN STATION TRANSMISSIONS.
6. The "MANUAL-SCAN" switch may now be used to select and monitor any desired channel.
7. To sample all channels automatically, return the "MANUAL-SCAN" switch to "SCAN". Any channel may be omitted as desired by moving the individual channel switch downward (off).

CRYSTAL INSTALLATION

DISCONNECT POWER BEFORE REMOVING CABINET

LEAVE POWER OFF WHILE INSTALLING CRYSTALS

To remove the cabinet, first remove the screw at the bottom rear edge. Push the rear panel forward through the cabinet. The components and crystal sockets are in full view and easily accessible.

Up to eight crystals may be installed in any combination of L, H, or U/T bands. Each crystal is installed in the sockets corresponding to its channel. (Channel 1 is nearest the side of the radio)

The eight three-position slide switches select the desired band for each crystal. To select "Lo" Band (30-50mHz) for a particular channel, place the corresponding switch in the "L" position. (Nearest the front of the radio). The center or "H" position of the switch selects "Hi" Band (150-174mHz) and the third or "U/T" position is used for both "U" (450-470 mHz) and "T" (470-512mHz) bands.

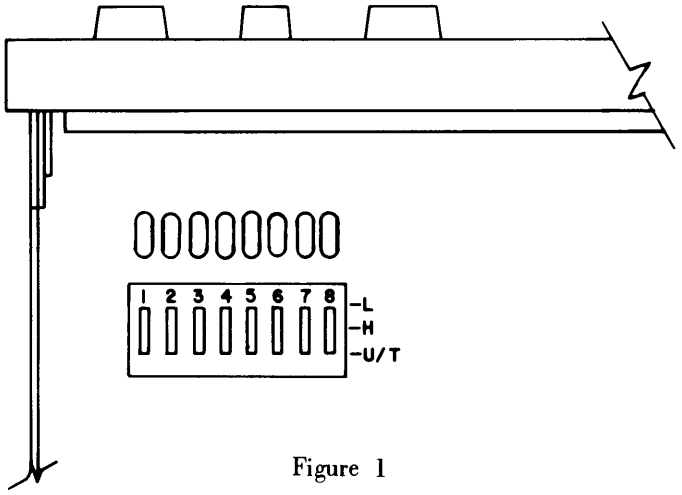


Figure 1

Remove the crystal by a gentle pull upward. Insert the crystal by aligning the pins with the sockets and pushing straight down. DO NOT BEND THE SOCKETS. THESE MINIATURE SOCKETS ARE MADE OF SPRING BRONZE AND WILL BREAK OFF IF BENT EXCESSIVELY.

NOTE: Do not install two crystals of the same frequency.

Rigid quality standards are applied to crystals furnished by Electra Company to assure full performance, therefore our warranty does not include correcting poor operation caused by crystals from other sources.

The "U/T" alignment spread is 450mHz to 512mHz, the "H" 150mHz to 174mHz, and the "L" 33mHz to 48mHz. New frequencies may be added within these spreads.

CRYSTAL FORMULAS

"L" – Received frequency + 10.80 mHz = crystal frequency
Example: 35.80 mHz + 10.80 mHz = 46.60000 mHz

"H" – $\frac{\text{Received frequency} - 10.80 \text{ mHz}}{3}$ = crystal frequency

Example: $\frac{155.01 \text{ mHz} - 10.80 \text{ mHz}}{3}$ = 48.07000

"U/T" - $\frac{\text{Received frequency} - 10.80 \text{ mHz}}{9}$ = crystal frequency

Example: $\frac{453.250 \text{ mHz} - 10.80 \text{ mHz}}{9}$ = 49.16111 mHz

USER HINTS

Radio equipment usually operates in an environment of man-made electro-magnetic noise which radiates from power lines, fluorescent lights, motors, appliances, ignition systems, etc. Modern radios are designed to minimize interference from such sources but operation may be affected under conditions of unusually strong noise.

Distant weak, "skip" or noise signals may be received by this receiver because of its high sensitivity. Whenever such conditions interrupt scanning or whenever a very busy channel prevents reception of other desired signals, the affected channel may be bypassed by means of its individual panel switch.

In cases of strong interfering noise or signals it may be desirable to reduce the length of the antenna to reduce noise pickup below a critical level. This may be very effective in medium and strong signal areas.

Single-channel operation may be obtained as described under Operating Instructions. It may also be accomplished with the "MANUAL-SCAN" switch in either position by locking out all but the desired channel. This assures that the radio will always be on that channel even when turned OFF and ON. Continuous-carrier signals such as the ESSA weather broadcasts on 162.55mHz, which are available in many areas, may be received when desired by use of the individual channel switches.

In mobile service the commonly encountered poor reception conditions are signal fading, nearby faulty ignition systems, power lines and proximity to strong signals. Careful setting of the squelch control will minimize these conditions.

When moving or shipping the radio, remove the telescoping antenna to avoid damage to it or to the internal circuit assemblies.

RADIO SERVICES

Local Government	Special Emergency	Police
Highway Maintenance	–Hospitals	Fire
Forestry-Conservation	–Ambulances	Press
Motion Pictures	–Physicians	Business
Special Industrial	–Disaster Relief	Railroad
Telephone Maintenance	–School Busses	Taxicab
Automobile Emergency	Power	Marine
Public Mobile Radio	Petroleum	Manufacturers
Mobile Telephones	Forest Products	Motor Carrier
		Rural Radio

ALIGNMENT

I–F SECTION

Alignment of the I–F system consists of optimizing the input and output networks and balancing the detector output. The bandpass and center frequency are established by quartz crystal filters and "peaking" the coils can result in bandpass ripple or poor sensitivity. Field alignment should not be necessary but the procedure is given for general information.

EQUIPMENT NEEDED

Oscilloscope

Sweep generator with 10.79, 10.80 and 10.81mHz markers

1. Connect sweep generator to TP-1 through a 1pf capacitator.
2. Connect oscilloscope to TP-3.
3. Maintain output of 10.80mHz sweep generator at a low level to prevent distortion from overloading.
4. Detune T5 for maximum IF output display. See Figure 2.
5. Adjust T3 for maximum output, and T4 for minimum ripple.
6. Adjust T5 so that 10.80 mHz is in center of discriminator curve and for best linearity. See Figure 3.

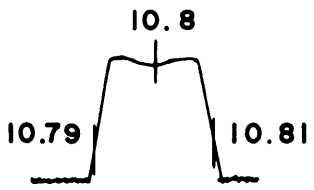


Figure 2

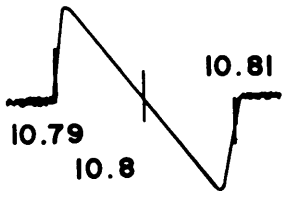


Figure 3

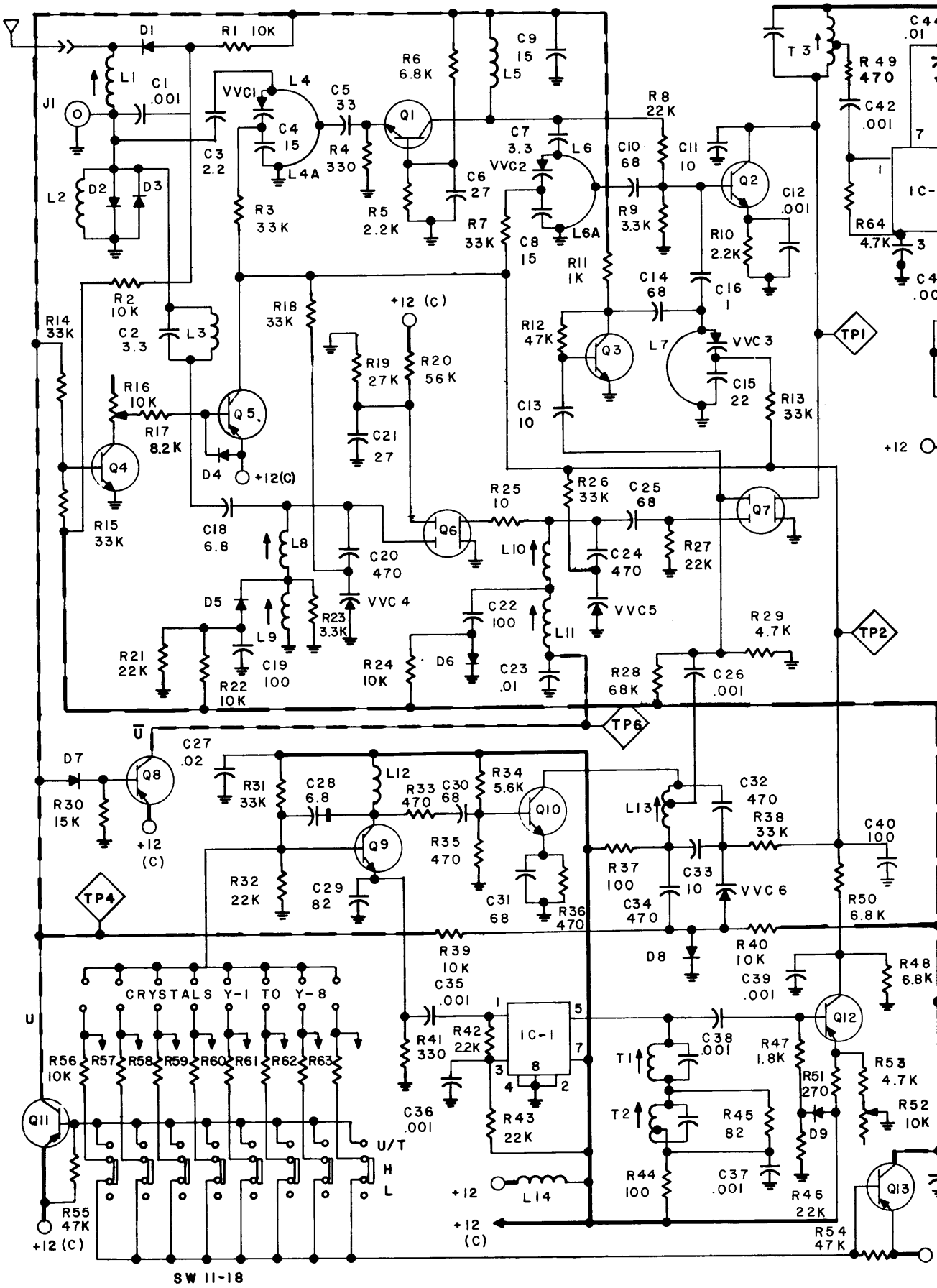
ALTERNATE METHOD: I–F alignment may be checked using a Measurements Model 800 Generator or equivalent tuned to an operating frequency and swept ±25kc. Markers are not essential since center frequency is determined by the filter.

R–F SECTION

DO NOT ATTEMPT ALIGNMENT OR "PEAKING" OF R–F SECTION.

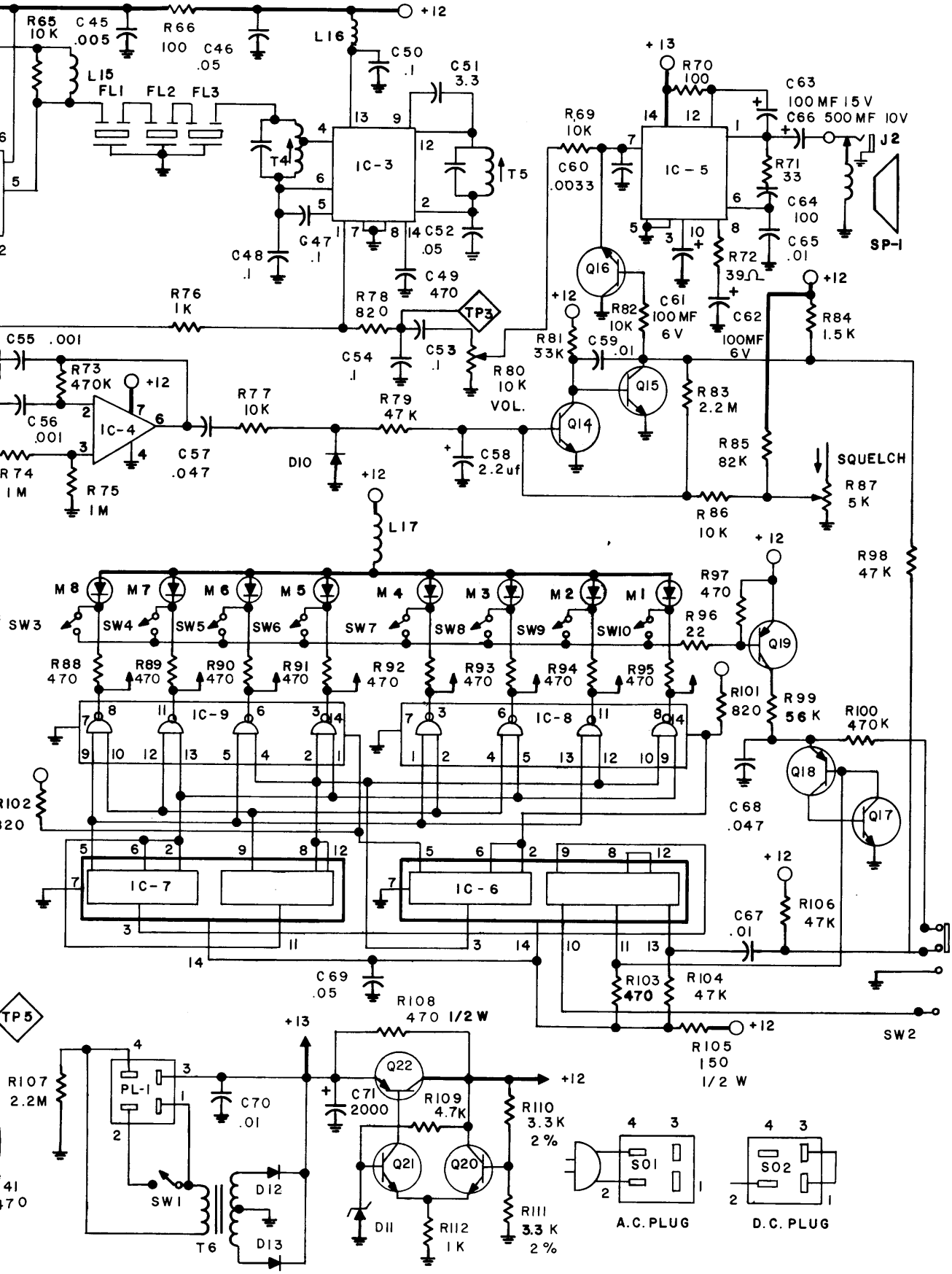
The R–F alignment points are adjusted and sealed at the factory and should not be disturbed. Factory alignment involves multi-frequency signal generation systems, add-on test modules, output indicators and training beyond the scope of normal service activities.

The unique R–F system includes electronic tracking of R–F and oscillator circuits for maximum performance over a wide range of frequencies. THIS PERFORMANCE CAN BE DESTROYED BY AN ATTEMPT TO "PEAK UP" OR "TWEAK" OR "OPTIMIZE", ETC.

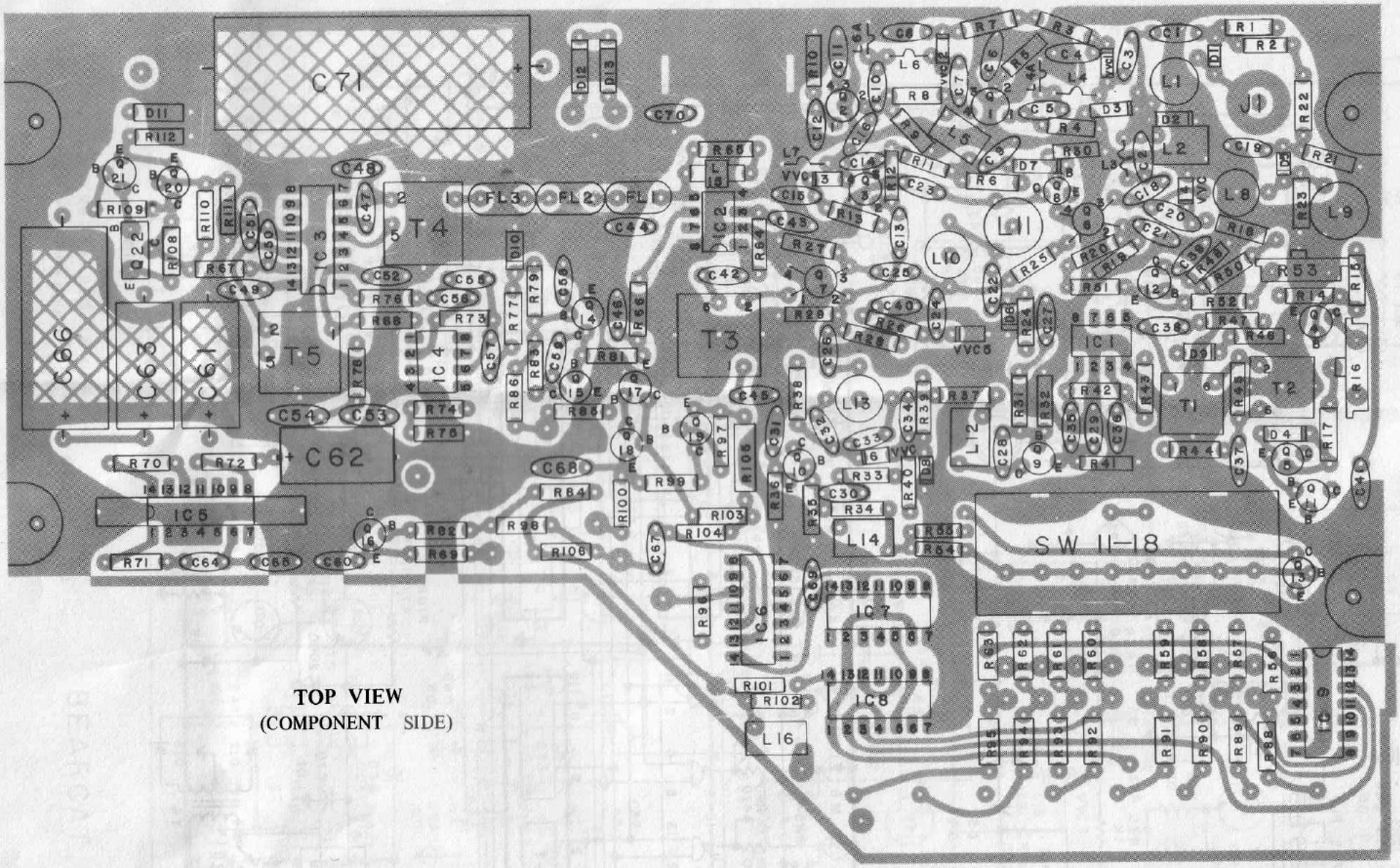


RESISTOR VALUES IN OHMS
CAPACITOR VALUES BELOW 1 IN MFD
ABOVE 1 IN pf
UNLESS OTHERWISE SPECIFIED

BEARCAT IV SCH


R65 10K
C45 .005
R66 100
C46 .05
L16
+12
C50 .1
C51 3.3
L15
FL1 FL2 FL3
T4
IC-3
T5
C47 .1
C48 .1
C52 .05
C49 470
TP3
R76 1K
R78 820
C55 .001
R73 470K
C56 .001
R74 1M
R75 1M
IC-4
C57 .047
R77 10K
R79 47K
D10
C58 2.2uf
C54 .1
C53 .1
R80 10K VOL.
+13
R70 100
C63 100 MF 15V
C66 500 MF 10V
J2
R69 10K
C60 .0033
IC-5
R71 33
C64 100
C65 .01
SP-1
Q16
R72 39Ω
R82 10K
C61 100 MF 6V
C62 100MF 6V
R84 1.5K
R81 33K
C59 .01
Q15
R83 2.2M
Q14
R85 82K
SQUELCH
R87 5K
R86 10K
L17
M8 M7 M6 M5 M4 M3 M2 M1
SW3 SW4 SW5 SW6 SW7 SW8 SW9 SW10
R97 470
R96 22
Q19
R98 47K
R88 470
R89 470
R90 470
R91 470
R92 470
R93 470
R94 470
R95 470
R101 820
R99 56K
R100 470K
IC-9
IC-8
Q18
Q17
C68 .047
R102 820
IC-7
IC-6
R106 47K
C67 .01
C69 .05
R103 470
R104 47K
R105 150 1/2 W
SW2
TP5
R108 470 1/2 W
R107 2.2M
PL-1
C70 .01
C71 2000
Q22
R109 4.7K
R110 3.3K 2%
Q21
Q20
R111 3.3K 2%
R112 1K
D11
SW1
D12
D13
T6
S01
A.C. PLUG
S02
D.C. PLUG

MATIC



TOP VIEW
(COMPONENT SIDE)

VOLTAGE CHART

The Voltage Chart may be used as an approximate guide in following circuit operation or locating a defective stage. You should be familiar with the entire manual before attempting measurements.

INTEGRATED CIRCUIT VOLTAGES

IC No.	1	2	3	4	5	6	7	8	9
PIN 1	1.4	1.4	5.6	0	8	NC	NC	.1	5
2	GND	GND	3.4	6	NC	5.2	5	.1	5
3	1.45	1.45	0	6	GND	5	.1	12	12
4	GND	0	1.4	GND	NC	NC	NC	.1	5
5	11.6	10.5	1.4	NC	GND	.2	.1	5	.1
6	12	11	1.4	6	.6	5.2	5	12	12
7	12	10.2	GND	12	0	GND	GND	GND	GND
8	GND	0	GND	NC	1.3	5	5	.2	12
9	x	x	.15	x	NC	.1	.1	5	.1
10	x	x	1.5	x	6.4	1.6	NC	5	.1
11	x	x	NC	x	NC	6	5	12	12
12	x	x	3.4	x	15.2	5	5	5	.1
13	x	x	12	x	NC	6	NC	.1	5
14	x	x	6.2	x	15.6	6.2	6.2	5.2	.2

Channel No. 1 selected.

LOGIC CHART

The logic sequence for counting is shown by "0" under .5v and "1" over 4v. I.C.-6 pins 8 and 9 (*) change state on each movement, up or down, of the "Manual-Scan" Switch.

	COUNT								
I. C. No.	PIN	1	2	3	4	5	6	7	8
6	5	0	0	0	0	1	1	1	1
	6	1	1	1	1	0	0	0	0
	8*	1	1	1	1	1	1	1	1
	9*	0	0	0	0	0	0	0	0
7	5	0	1	0	1	0	1	0	1
	6	1	0	1	0	1	0	1	0
	8	1	1	0	0	1	1	0	0
	9	0	0	1	1	0	0	1	1
9	8	0	1	1	1	1	1	1	1
	11	1	0	1	1	1	1	1	1
	6	1	1	0	1	1	1	1	1
	3	1	1	1	0	1	1	1	1
8	3	1	1	1	1	0	1	1	1
	6	1	1	1	1	1	0	1	1
	11	1	1	1	1	1	1	0	1
	8	1	1	1	1	1	1	1	0

TRANSISTOR VOLTAGES

TEST CONDITION	Q No.	E	B	C	
	Q1	2.3	3	12.0	
	2	.8	1.5	11.0	
	3	GND	.7	6.0	
L/(HUT)	4	GND	0/07	12/0	
	5	12.0	11.4	*	
LH/UT	8	12.0	11.3/11.6	12.0/0	
	9	3.4	3.8	12	
NO XTAL/XTAL..	10	.25/1.2	.9	12/11.8	
LH/UT	11	12	11.9/11.3	0/12	
	12	11.7	*	*	
LUT/H	13	12	12/11.3	0/12	
SQUELCH CW/CCW	14	GND	.4/.7	.7/.04	
SQUELCH CW/CCW	15	GND	.7/.04	.08/10.5	
SQUELCH CW/CCW	16	.007/.0003	.08/.7	GND	
	17	GND	0	6	
MAN/SCAN	18	0/4	6	0	
MAN/SCAN	19	12	12	.05/4.0	
	20	5.4	6	12	
	21	5.4	6	15	
	22	15.6	15	12	
		D	S	G_1	G_2
LH/UT	Q6	11.8/0	GND	0	4
LUT/H	Q7	11	GND	0	0/.7

*Tuning Voltage – varies with crystal frequency.

SERVICING

GENERAL

It is recommended that servicing of this receiver be done by the factory service center. Special equipment and skills are maintained at the factory to give fast and efficient service on all of our products.

When returning radio receivers to the factory for service, include crystals, ac and dc power cables and telescoping antenna. Disconnect cables and antenna, pack carefully and include a brief, detailed description of the difficulty you are having.

The receiver circuitry is designed to utilize the best features of four types of semiconductors: rectifier diodes, conventional bi-polar transistors, insulated-gate field-effect transistors and integrated circuits. Servicing should not be attempted by anyone who is not familiar with the manufacturer's recommendations and cautions relating to each of these devices. The use of ohmmeters is particularly hazardous since they can deliver voltages and currents large enough to damage semiconductors.

Unusual circuitry in this receiver includes the automatic tuning system. I.C. No.1 and the associated circuits generate tuning voltages to track the antenna, r-f and oscillator circuits as channels are scanned. Also, when the receiver is operating in the "L" band, loading coil L-1 is switched into the telescoping antenna circuit.

Audio output power is measured with bursts of modulation or by measuring the maximum excursion on voice modulation as shown on an oscilloscope. When a continuous tone is received, the output will start at full power and then decrease to approximately half power to protect the output integrated circuit from overload. It will then return to full power for voice communications.

The LED indicators have a forward voltage drop of about 1.6v at 20ma. The current should not exceed 50ma. They are polarized and may be damaged by a high reverse voltage. When a channel lamp does not light, the failure may be either the lamp or the switching I.C. If the channel works, check the lamp; if not, check the I.C. When groups of lamps are out, refer to the logic chart.

TRACKED TUNING SYSTEM

All tuned circuits in the RF sections are tuned by voltage-variable capacitators which optimize the radio for each crystal individually regardless of where it falls in any band. This tuning is done automatically and allows the Bearcat IV to tune all parts of any band without compromise.

Tracked tuning is accomplished by means of a DC voltage applied to VVC1. 2, 3, 4, 5, 6. This voltage varies with crystal frequency and is higher for higher frequency crystals. It is adjusted by T1. T2. R17 and R52.

Factory alignment of the RF and tracked tuning system involves highly specialized equipment and training not available to normal service activities.

Because this unique feature is outside the experience of even the most highly trained technicians. these adjustments should only be made by Electra.

BANDSWITCHING

Switches SW11-18 are used to select the proper band for each channel. These switches, the channel scanning logic (IC6, 7. 8. 9) and transistor switches Q8, Q11, and Q13 generate three 12V bandswitch signals– $\overline{U}$, U, and H. These signals select the proper RF section (VHF or UHF) and switch inductors in the VHF section to select L or H band. For any selected channel, the logic diagram is as follows:

Band Selected	$\overline{U}$	U	H
L	1	0	0
H	1	0	1
U/T	0	1	0

0 = 0VDC
1 = 12VDC

BANDSWITCHING FUNCTIONS

U (Q11) on for U/T band only
1. Switches D8 on (Grounds Tripler Tank)
2. Switches Q8 off
3. Switches Q4 on (Shifts tuning voltage upward)
4. Switches D1 on (Shorts antenna loading coil)
5. Supplies bias voltages to Q1, Q2, Q3 (UHF Section)

$\overline{U}$ (Q8) on for L or H band
Supplies drain voltage to Q6 (VHF amplifier)

H (Q13) on for H band only
1. Switches D8 on (Grounds Tripler Tank)
2. Supplies Gate 2 bias to Q7 (UHF Mixer)
3. Switches D5 and D6 on (Shorts out low band coils L9 and L11)
4. Switches Q4 on (Shifts tuning voltage upward)

SERVICE PARTS LIST

Ref. No.	Resistors, ¼W 10%	List Price
R-1, 2, 22, 24, 39, 40, 56 thru 63, 65, 69, 77	10k	$ .25
R-3, 7, 13, 14, 15, 18, 26, 31, 38, 81	33k	.25
R-4, 41	330	.25
R5, 10, 42	2.2k	.25
R-6, 48, 50	6.8k	.25
R-8, 21, 27, 32, 43, 46	22k	.25
R-9, 23	3.3k	.25
R-11, 76, 112	1k	.25
R-12, 54, 55, 79, 98, 104, 106	47k	.25
R-16, 53, ¼W. 20%	10K, Var.	.75
R-17	8.2k	.25
R-19	27k	.25
R-20, 99	56k	.25
R-25	10	.25
R-28	68k	.25
R-29, 52, 64, 109	4.7k	.25
R-30	15k	.25
R-33, 35, 36, 49, 88 thru 95, 97, 103	470	.25
R-34	5.6k	.25
R-37, 44, 66, 70	100	.25
R-45	82	.25
R-47	1.8k	.25
R-51	270	.25
R-71	33	.25
R-72	39	.25
R-73, 100	470k	.25
R-74, 75	1 Meg.	.25
R-78, 101, 102	820	.25
R-80, SW-1, ¼W. 30%	10k Vol. w/sw	2.00
R-83	2.2 Meg.	.25
R-84	1.5k	.25
R-85	82k	.25
R-87, ½W. 30%	5k Var./Squelch Control.	1.50
R-96	22	.25
R-105, ½W. 10%	150	.25
R-107, ½W. 10%	2.2 Meg.	.25
R-108, ½W. 10%	470	.25
R-110, 111	3.3k, 2%	.25

	Capacitors	
C-1, 12, 26, 35, 36, 37, 38, 39, 42	.001mf 20% Disc. Cer.	.50
C-2, 7, 51	3.3pf 20% Disc. Cer.	.50
C-3	2.2pf 20% Disc. Cer.	.50
C-4, 8, 9	15pf 10% Disc. Cer.	.50
C-5	33pf 20% Disc. Cer.	.50
C-6, 21	27pf 10% Disc. Cer.	.50
C-10, 14, 25, 30, 31	68pf 10% Disc. Cer.	.50
C-11, 13, 33	10pf 10% Disc. Cer.	.50
C-15	22pf 10% Disc. Cer.	.50
C-16	1pf ± .25% Disc. Cer.	.50
C-18, 28	6.8pf 5% Disc. Cer.	.50
C-19, 22, 40, 64	100pf 10% Disc. Cer.	.50
C-20, 24, 32, 34, 41, 49	470pf 20% Disc. Cer.	.50
C-23, 45, 59, 65, 67, 70	.01mf 20% 50V Disc. Cer.	.50
C-27	.02mf 20% 50V Disc. Cer.	.50
C-29	82pf 10% Disc. Cer.	.50
C-43, 44	.005mf 20% Disc. Cer.	.50
C-46, 52, 69	.05mf 50V Disc. Cer.	.50
C-47, 48, 50	.1mf GMV 10V Disc. Cer.	.50
C-53, 54	.1mf 10% 33V Mylar	.75
C-55, 56	.001mf 10% 33V Mylar	.75
C-57, 68	.047mf 10% 33V Mylar	.75
C-58	2.2mf Solid Al. 20% 6V	.75
C-60	.0033mf 10% 33V	.50
C-61, 62, 63	100mf Lytic 15V	1.00
C-66	500mf Lytic 10V	1.00
C-71	2000mf Lytic 20V	1.50

Ref. No.	Semi-Conductors	List Price
Q-1, 2, 3	2N5179	2.50
Q-4, 14, 15, 16, 17, 20, 21	MPS-3393	.75
Q-5, 8, 11, 13, 18, 19	2N4126	.75
Q-6, 7	3N201	2.50
Q-9, 10	2N3563	.75
Q-12	MPS-3640	.75
Q-22	TIP-30	1.50
D-1, 5, 6, 8	MPN-3401	1.00
D-2, 3, 4, 9, 10	1N914	.50
D-7	1N34A	.50
D-11	6V Zener ± .1	1.00
D-12, 13	1N4001	.50
VVC1, 2, 3	BB-105A (Matched)	2.00
VVC4, 5, 6	BB-209 (Matched)	2.00
IC1, 2	LM-703LN	1.50
IC3	MC-1357P	3.50
IC4	UA741	3.50
IC5	UA706	5.00
IC6, 7	SN7474	2.00
IC8, 9	SN7426	1.50

	Inductors	
L-1	A-219-1 Loading Coil	1.00
L-2, 14	A-218-1 Choke	.50
L-3	A-509 Choke	.50
L-4, 6, 7	A-508-1 Coil	.50
L-4A, 6-A	A-508-2 Coil	.50
L-5	A-218-4 Choke	.50
L-8, 10	B-501-2 Coil	.50
L-9, 11	B-511 Coil	.50
L-12	A-218-3 Choke	.50
L-13	B-501-1 Coil	.50
L-15, 16	A-205 Choke	.50
L-17	A-218-2 Choke	.50
T-1	B-502-2 Coil (tracking)	1.50
T-2	B-502-1 Coil (tracking)	1.50
T-3, 4, 5	B-217-2 Coil (I.F.)	2.00
T-6	B-507 Power Transformer	3.50

	Miscellaneous	
Y-1, 8	A-135 Crystal	5.00
FL-1, 3	A-226-1 Crystal Filter	10.00
FL-2	A-226-2 Crystal Filter	10.00
A-235-1	P. C. Board, L.E.D.	.75
SW-2	B-254-1 Man-Scan Switch	2.00
SW-3-10	GF-124 C. W. Switch	.75
SW-11, 18	A-503-1 Frame, SW	1.00
SW-11, 18	A-504-1 Contact, SW	.25
SW-11, 18	A-505-1 Handle, SW	.25
J-1	1207 Antenna Connector	.75
	1200 Antenna Plug	.75
J-2	3512A Ext. Speaker Jack	1.00
PL-1	P3304AB Power Conn.	1.00
SO-2, 3	S-3304-FHT-M Socket	1.00
	DC Cord Assembly	1.50
	AC Cord Assembly	1.50
	Mobile Mounting Kit	2.00
SP-1	B-248-2 Speaker 3x5	3.00
	A-138-2 Telescoping Antenna	1.50
	B-228 Front Panel	$ 1.75
	C-233 Trim	3.00
	C-203 Wrap Assembly	7.50
	A-237 Antenna Bushing	.75
	RB-155-840 Knob	.75

Replacement parts may be ordered directly from:
Electra Co. – P. O. Box 29243 – 300 S. County Line Rd. – Cumberland, Ind. 46229
Cash order for parts will be shipped prepaid.

RETURN WARRANTY CARD WITHIN 10 DAYS

DO NOT ABUSE OR MODIFY RADIO

NEVER REMOVE A SERIAL NUMBER

WARRANTY

This receiver is guaranteed to be free from defects in material and workmanship. We agree to remedy such defect or to furnish a new part in exchange for any part which, under normal installation, use and service, discloses such defect, provided the receiver is delivered to us, intact, for our examination, with all transportation charges prepaid to our factory, within one year from the date of sale to the original purchaser, and provided such examination discloses, in our judgment, that it is thus defective.

This warranty does not apply if the receiver has been subjected to misuse, neglect, accidents, incorrect wiring not our own; improper installation, or to use in violation of instructions furnished by us, nor to receivers that have been repaired or altered outside our factory.

This warranty excludes all oral or other implied warranties, and the manufacturer shall in no event be liable for damages for a breach of warranty in an amount exceeding the purchase price of the alleged defective equipment.

TO PLACE WARRANTY IN FORCE FILL OUT AND RETURN WARRANTY CARD WITHIN TEN (10) DAYS OF PURCHASE.

ELECTRA COMPANY
DIVISION OF MASCO CORPORATION
300 East County Line Rd., South
Cumberland, Indiana 46229

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